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GB 1494753
GB 1270682

(58) Field of search
G4N

(54) Burglar alarm system

(57) A burglar alarm system includes a sensor circuit (SC) comprising at least one sensor switch (SW), and a control circuit (CC) to which the sensor circuit is connected, and operable when the system is activated to apply a potential difference across the sensor circuit and to detect a change in the flow of current through the sensor switch. Test means (TC) are provided, operable when the system is in a test mode to reverse the polarity of the potential difference applied across the sensor circuit. A display device (DD), which may be a light-emitting diode, is connected to the sensor switch so as to be responsive to the said reversed polarity to indicate the condition of the sensor switch. A sensor circuit may comprise a number of series or parallel-connected switches, and more than one sensor circuit may be provided.

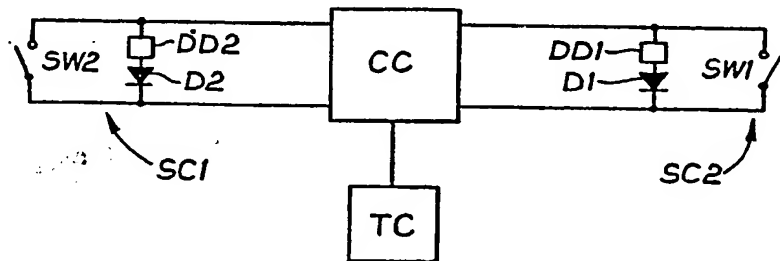


Fig. 1

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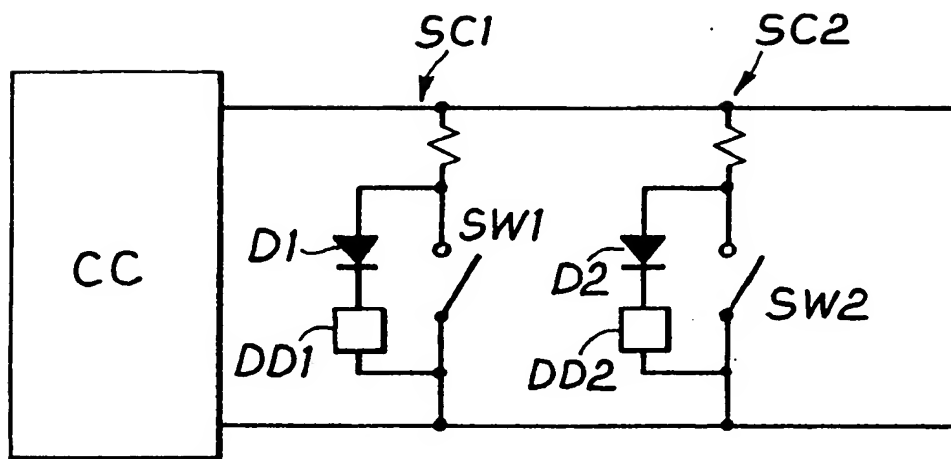


Fig. 3

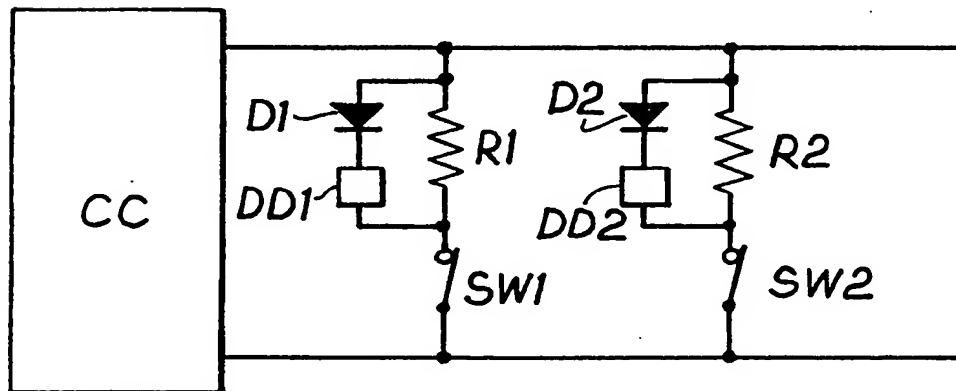


Fig. 4

SPECIFICATION

Burglar alarm system

This invention relates to a burglar alarm system of the type in which separate sensors are used for each alarm point, such as windows, doors and the like. If a system has a large number of sensors, activating the system can take a long time. It is necessary to ensure, for example, that all doors and windows are closed and fastened, and the system then has to be activated to check the condition of each sensor. If a fault indication occurs, it is then necessary to deactivate the system, check that particular sensor again, and then reactivate the system.

It would therefore be desirable if an alarm system could provide an indication at the sensor of the state of that sensor, prior to activating the alarm system. The closing of a window or door, for example, could then be checked or repeated until a correct indication was obtained, prior to the system being activated.

It is an object of the invention to provide an alarm system which provides such an indication at selected sensors.

According to the present invention there is provided a burglar alarm system which includes a sensor circuit comprising at least one sensor switch, a control circuit to which the sensor circuit is connected and operable when the system is activated to apply a potential difference across the sensor circuit and to detect a change in the flow of current through the sensor switch, test means operable when the system is in a test mode to reverse the polarity of the potential difference applied across the sensor circuit, and a display device connected to the sensor switch and responsive to the said reversed polarity to indicate the condition of the sensor switch.

The invention will now be described with reference to the accompanying drawings, in which:—

Figure 1 is a schematic diagram of a system having a single normally-open switch in each sensor circuit;

Figure 2 is a similar diagram of a system having a single normally-closed switch;

Figure 3 shows a system having a number of normally-open switches connected in parallel;

Figure 4 shows a system having a number of normally-closed switches connected in parallel;

Figure 5 illustrates the application of the invention to a modified alarm system; and

Figure 6 illustrates a modification of the arrangement of Figure 5.

Referring now to Figure 1, this shows a schematic circuit diagram of a simple burglar alarm system. A number of separate sensor circuits SC1, SC2 etc, each containing a single normally-open switch SW, are connected to a common control circuit CC. The control circuit applies a potential difference across each sensor circuit and is arranged in the activated condition to detect the flow of current in a sensor circuit caused by the closing of a sensor-switch. For the

sake of simplicity the alarm condition detector is not shown, such arrangements being well-known. Across each switch is connected a display device DD comprising a current-activated device such as a light source or an electro-mechanical indicator, connected in series with a diode D poled in such a way that current does not flow through the display device when the alarm system is in the activated condition. A test circuit TC connected to the control circuit causes the polarity of the potential difference applied across the sensor circuits to be reversed. In a simple arrangement the alarm condition detector may be rendered inoperative when the system is in the test mode. Alternatively the detector may remain operative to indicate the presence of a faulty sensor.

In operation, the alarm system operates normally when activated, the connection of the diode D in each sensor circuit preventing current flow through the display device DD. When the system is put into the test mode the diodes DD become conducting due to the reverse polarity of the voltage supply, and current flows through the display device DD if the sensor switch SW is in its correct normally-open condition. If, however, the switch is closed, then the display device will be short-circuited by the switch and will not operate. Hence the display device indicates whether or not the sensor switch has been correctly set. Thus whilst checking all doors and windows, for example, prior to activating the system, it is only necessary to check that each associated display device has operated whilst the system is in the test mode.

If the system uses normally-closed switches in place of those normally-open switches described above, then each sensor circuit may be modified as shown in Figure 2. A resistor R is connected in series with the normally-closed switch SW, and the diode D and display device DD are connected in series with one another across the resistor R. The value of the resistor is such that sufficient voltage will be developed across it by the current flowing through it to activate the display device when in the test mode. In operation in the activated condition the voltage developed across the resistor R is of the wrong polarity to allow the display device to be activated, but the reverse polarity of the test mode causes the display device to be activated if the sensor switch SW is in its normal closed condition. If the resistor R is unnecessary or undesirable when the system is in the activated condition, then a second diode BD may be connected across it so that the diode bypasses the resistor. The voltage drop across the resistor is then replaced by the voltage drop across the diode.

Some burglar alarm systems have a number of normally-closed switches connected in series with one another to form a single sensor circuit. The system will then respond to the opening of any one switch, though it may not be possible to identify which switch has opened, nor if more than one switch is opened. Each switch in such an arrangement may be provided with a display

sensor circuit comprises a plurality of normally-open sensor switches connected in parallel with one another, a separate display device being connected across each switch contact.

- 5 6. A system as claimed in Claim 1 in which the sensor circuit comprises a plurality of normally-closed sensor switches connected in parallel with one another, a separate resistor connected in series with each sensor switch, and a separate display device connected in parallel with each said resistor.

- 10 7. A system as claimed in Claim 1 in which each sensor switch includes first and second series-connected resistors and a normally-open sensor contact connected in parallel with the first resistor, the display device being connected in parallel with the sensor circuit.

- 15 8. A system as claimed in Claim 7 which includes a diode connected in parallel with the second resistor so as to bypass said resistor when the system is in the test mode.

- 20 9. A system as claimed in Claim 1 in which each sensor switch includes first and second

- 25 series-connected resistors and a normally-closed sensor contact connected in parallel with the first resistor, the display device being connected in series with a diode across the first and second series-connected resistors, a second switch being provided to short-circuit the display device when the sensor switch is other than in its normally-closed condition.

- 30 10. A system as claimed in any one of Claims 1 to 9 in which the display device includes a series-connected diode.

- 35 11. A system as claimed in any one of Claims 1 to 10 in which the display device comprises a light-emitting diode.

- 40 12. A system as claimed in any one of the preceding claims in which the test means is operable to apply an intermittent potential difference to the sensor circuit when in the test mode.

- 45 13. A burglar alarm system substantially as herein described with reference to the accompanying drawings.